

**CONLEY**  
**ASSOCIATES**

# Memorandum

To: Roland Bartl, Town Planner  
From: Leslie Grant, Transportation Engineer  
CC: Planning Board  
Date: October 19, 2007  
Re: The Residences at Quail Ridge

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In March of 2007, Conley Associates, Inc. conducted a Traffic Impact Study (TIS) for the addition of 175 units of age restricted housing (and conversion of the 18-hole golf course to a 9-hole course) to the existing Quail Ridge Country Club in Acton, Massachusetts. In June of 2007, Conley Associates, Inc. completed a supplemental memorandum detailing the traffic impact a 7,500 square foot restaurant would have on the Level of Service (LOS) results presented in the TIS. The following memorandum addresses the traffic concerns raised in the September 17, 2007 memorandum issued by the Town Planner to the Planning Board (only items 1.a. through 1.g. are traffic related items and thus addressed in this correspondence).

**1. Access, Circulation, and Traffic Impacts**

**a. Acorn Park Special Permit**

**The proposal shows two routes of access to Great Road—Skyline Drive and Acorn Park Drive via Hazelnut Street and Palmer Lane. The Plan as proposed complies with this requirement.**

The project will continue to meet requirements regarding two routes of Access to Great Road. However, based on concerns from residents in the Acorn Park Drive neighborhood, the site plan has been revised so that general access to site will be restricted to Skyline Drive and only emergency access will be provided via Palmer Lane.

**b. Trip Generation and Volume Projections**

**The applicant's traffic consultant has made reasonable assumptions for the trip generation from the proposed housing units and restaurant. I am less convinced by the proposed discounting for the reduction in holes at the golf course from 18 to 9. The source citation (ITE Trip Generation Manual) notes the high volatility of their numbers due to the low sample numbers and the wide spread of data points. It seems intangibles such atmosphere, friendships, surrounding population density, setting, quality of food and services, etc. might play a larger role than the number of holes in a course.**

The Planning Board finds our assumptions for the residential units and restaurant trip generation to be reasonable. The credit for the reduction in the number of

holes on the golf course was based on the description for Land Use Code 430—Golf Course in the ITE Trip Generation Manual, 7<sup>th</sup> Edition. "The golf courses contained in this land use include 9-, 18-, 27-, and 36-hole municipal courses and private country clubs. Some sites have driving ranges and clubhouses with a pro shop and/or restaurant, lounge and banquet facilities. Many of the municipal golf courses do not have any of these facilities." Conley Associates, Inc. did not have any reliable data from other golf course facilities where a reduction in the number of holes had occurred; therefore the credit was based on the available data in ITE, which looked at 9-, 18-, 27-, and 36-hole courses.

Although it is quite likely that there will be less trips to a 9 hole golf course versus and 18 hole golf course, to address the Planning Board's concern regarding the appropriateness of the credit assumed for the 9-hole reduction, Conley Associates, Inc. recalculated the Level of Service (LOS) and delay results for the study area intersections assuming NO credit for the reduction in the number of holes and a higher growth rate as requested by the Town Planner and the Engineering Department (see next comment). In addition, MassHighway recently implemented timing improvements at the intersection of Great Road at Main Street. These timing changes include a northbound advance for Great Road (heading towards Skyline Drive) and optimized timings for each approach. It was determined that with a higher growth rate, no credit for the golf course, and with the recently updated timings that the signalized intersection of Great Road at Main Street is expected to operate at LOS D or better under all conditions and the unsignalized approaches to Great Road will continue to operate at LOS F.

**The traffic consultant's study assumes a background growth of only 0.5% per year. I find this suspect in light of the fact that all other traffic studies in recent memory have assumed a background growth of 1% or greater. In addition, recent conversations with traffic consultants during the interview process for one of the Town's own projects, several experts in the field confirmed the use of 1% per year as the appropriate number for background growth. Looking at MassHighway permanent count stations, the historic growth rate, which is used to project forward, may be different if the applicant's traffic consultant would look at the same time window that most others profess to use for their projections. The assumptions for annual background traffic growth have a significant effect on the projected level of service and capacity 5 and 10 years from now.**

Conley Associates, Inc. growth rate was based on MassHighway historical data from a number of count stations located on Route 2, Route 27, Route 119/2A, and School Street in Acton as well as stations located on the Cambridge Turnpike, Route 2, and Route 62 in Concord. As stated in the TIS, the growth rate based on data from 1996 through 2005 is a negative 0.06 percent. It is unclear what the Planning Board means by "the same time window that most others profess to use for their projections." If Conley Associates, Inc. were to look at only the most recent five years of data available at these counts stations (2001 through 2004), the growth rate would be a positive 0.50 percent, the growth rate used in the TIS.

As stated in the TIS, the growth rate based on District wide data from MassHighway showed an annual growth rate of 1.40 percent but the growth rate based on counts conducted on Great Road near the site showed a growth rate of 0.58 percent per year. The available data from Automatic Traffic Recorders (ATRs) on Great Road, MassHighway permanent counts stations, and MassHighway District wide data, ranged from positive 2.87 percent to negative 0.05 percent, a wide range in growth rates. Therefore, Conley Associates, Inc. does not agree that a higher growth rate of one or two percent is more appropriate.

However, to satisfy the concerns raised by the Town Planner and Engineering Department regarding growth rates, the No Build and Build traffic volumes were recalculated using a more conservative growth rate of 1.7 percent per year. In addition, as stated in the previous section, no credit was assumed for the reduction in the number of holes on the golf course and Conley Associates, Inc. used the timing changes recently implemented by MassHighway at the signalized intersection of Great Road at Main Street.

As stated in our response to the previous comment, the signalized intersection of Great Road at Main Street is expected to operate at LOS D or better under all conditions and the unsignalized approaches to Great Road will continue to operate at LOS F.

c. **Trip Distribution on Great Road**

It appears that the applicant's traffic consultant has assumed a directional split of traffic from the development-30% westbound on Great Road (2A/119) and 70% eastbound on Great Road. With these assumptions, the traffic study conclusion is a modest deterioration of operations with either no drop in Levels of Service (LOS) or a one-letter drop; say from C to D. Note that F is the lowest LOS category. So, an intersection or movement that is already at F (unsignalized left turns, for instance) will remain at F, but only because there is no G or H on the rating scale. Similarly, the traffic signal warrant analyses turn back negatives. What happens if the distribution assumptions need to change, as suggested in the next paragraph?

The trip distribution used in the TIS was based on existing commuting traffic patterns, which is standard engineering practice.

As stated in the TIS, the unsignalized approaches at the intersections of Great Road at Harris Street and Acorn Park Drive and Great Road at Skyline are currently operating at LOS F and will continue to operate at LOS F with or without the project in place. However, the LOS F conditions experienced by the unsignalized approaches to Great Road is not an uncommon occurrence along a busy roadway. As shown in the TIS, the through movements along Great Road are operating with little to no delay.

Conley Associates, Inc. recalculated the traffic impact of the project assuming all project traffic would only utilize Skyline Drive to access and egress the site.

Additionally, the analysis assumed a more conservative growth rate and no credit for the reduction in the number of holes on the golf course. Even with these assumptions, the exiting traffic volume on Skyline Drive does not meet the four hour or peak hour signal warrants. However, Conley Associates, Inc. recommends that the left turn lane on the Skyline Drive approach to Great Road be extended to accommodate a queue of approximately four or five vehicles.

d. **Trip Distribution to and from Great Road**

It is unclear what the assumption is for internal distribution, i.e., how much traffic would come and go via Skyline v. Acorn Park. It would not be the same as the directional split on Great Road. It should be provided since this assumption directly affects the Acorn Park neighborhood and streets. Traffic prediction is not an exact science; therefore they should be made with a reasonable set of assumptions that can find general acceptance given the proposed open circulation pattern.

Access for the project has been modified. Only one access will be provided on Skyline Drive for general traffic (emergency access will be provided via Palmer Lane). Therefore, the issue of internal distribution is moot. As indicated earlier in this memorandum, the trip distribution used in the TIS was based on existing commuting traffic patterns, which is standard engineering practice.

e. **Trip Distribution Alternatives**

For a number of possible reasons--say, for instance, neighborhood impacts on Acorn Park; -questions concerning the adequacy of Skyline Drive or the streets in Acorn Park or both; -management of most or all turning traffic at one signalized Great Road intersection such as opposed to creating two marginally functional unsignalized intersections; - it may be more prudent to turn the directional split to and from Great Road one way or the other. So what would happen to the traffic impact analysis and its conclusion with respect to the local street and the intersections of Great Road, if Skyline Drive was the only access and egress, if Acorn Park was the only access and egress, or if the connection to Acorn Park was one-directional.

As stated earlier in this memorandum, access for the project has been modified so that Skyline Drive will be the only access and egress for general traffic. Conley Associates, Inc. then recalculated the project's traffic impacts assuming a higher growth rate, no credit for the reduction in the number of holes at the golf course, and with the new timing changes at the signalized intersection of Great Road at Main Street. As stated in previous comments, the unsignalized approaches of Acorn Park Drive, Harris Street, and Skyline Drive will continue to operate at LOS F with or without the project in place and the signalized intersection of Great Road at Main Street is expected to operate at LOS D or better under all conditions. In addition, with two exiting lanes on Skyline Drive, the peak hour volumes exiting Skyline Drive are still not high enough to warrant a signal.

f. **Suitability of Acorn Park Streets**

For whatever level of access through Acorn Park, the applicant should evaluate the adequacy of Palmer Lane, Hazelnut Street, and Acorn Park Drive in view of the low-intensity local street standard for width and grade under which they were built.

As stated previously, the site plan layout has changed so that there will be no general vehicular access through the Acorn Park neighborhood. Skyline Drive will be the only access and egress for project traffic.

g. **Improvements**

The applicant's traffic consultant does not suggest a need for any improvements. This may be the case, but I would like to see the LOS and capacity projections with an annual growth rate of 1%. In addition, the police chief points out the need for deceleration/turning lanes on Great Road at Skyline Drive. Especially, the geometry for the right turn onto Skyline Drive, while it looked okay on paper, is not working well. Finally, guardrails should be considered along the steep slopes near the street at Skyline Drive.

Conley Associates, Inc. recalculated the project's traffic impacts assuming a 1.7 percent annual growth rate as suggested by the Engineering Department. In addition, no credit was taken for the reduction in the number of holes at the golf course and the timing changes recently implemented by MassHighway were also included in the analysis. As stated previously, the unsignalized approaches to Great Road are expected to continue to operate at LOS F with or without the project in place and the signalized intersection of Great Road at Main Street is expected to operate at LOS D or better under all conditions. The project is expected to increase delay at the signalized intersection by approximately four seconds or less during the peak hours analyzed. Even with all of the project traffic using Skyline Drive as the only access and egress, the Skyline Drive approach to Great Road does not meet signal warrants. However, Conley Associates, Inc. recommends that the left turn lane on the Skyline Drive approach to Great Road be extended to accommodate a queue of approximately four or five vehicles.

Conley Associates, Inc. reviewed the traffic impacts of adding a right turn lane on Great Road (for vehicles turning onto Skyline Drive). From a capacity standpoint, this additional turn lanes would not improve the level of service for movements on Great Road however, it would allow through vehicles on Great Road to bypass the vehicles turning right onto Skyline Drive. The reason the right turn lane would not improve operations at the intersection is that level of service at an unsignalized intersection is determined by the movement under stop control (Skyline Drive). At this time, the proponent is not recommending the addition of a right turn lane on Great Road. The site engineer will address the comment on guard rails.